Marks

Question 26 (5 marks)

Water can be described as either 'hard' or 'soft'.

(a) Describe a test you have used to determine whether a given sample of water is 'hard' or 'soft'. **2**

10 mL of sample water was added to the test tube. 2-3 drops of detergent were added to the test tube. The test tube was stoppered and shaked. If ~~there are some~~ grey scum forms, the water is hard.

(b) A sample of hard water contains 6×10^{-4} mol L^{-1} of magnesium carbonate. **3**

Calculate the mass, in mg, of magnesium carbonate in 150 mL of this sample.

6×10^{-4} mol / L $MgCO_3$

No. of moles of $MgCO_3$ in the sample = $\frac{6 \times 10^{-4}}{1000} \times 150 = 0.00009$

molar mass of $MgCO_3$ = 84.32 g

∴ mass of $MgCO_3$ in the sample is

84.32×0.00009

$= 0.0075888$ g

$= 0.75888$ mg

$\doteq 0.76$ mg (2 d.p.).